

**ABSTRACT**

The present invention relates to recombinant  
5 human interleukin-3 (hIL-3) variant or mutant proteins  
(muteins). These hIL-3 muteins contain amino acid  
substitutions and may also have amino acid deletions  
at both the N- and C- termini. The invention also  
relates to pharmaceutical compositions containing the  
10 hIL-3 muteins and methods for using them.  
Additionally, the present invention relates to  
recombinant expression vectors comprising nucleotide  
sequences encoding the hIL-3 muteins, related  
microbial expression systems, and processes for making  
15 the hIL-3 muteins using the microbial expression  
systems.

Included in the present invention are  
deletion mutants of hIL-3 in which from 1 to 14 amino  
20 acids have been deleted from the N-terminus, and from  
1 to 15 amino acids 119 to 133 have been deleted from  
the C-terminus, and which also contain amino acid  
substitutions in the polypeptide. These hIL-3  
multiple mutation polypeptides may have biological  
25 activities similar to or better than hIL-3 and, in  
some cases, may also have an improved side effect  
profile.

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